SUMMARY OF VASCULAR

INDEX

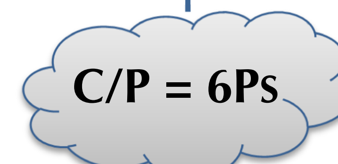
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ACUTE ISCHEMIA OF LL

"Sudden ↓ in the artrial bl. supply causing THREAT to limb viability!
Giving no time for collaterals to open"



1) Embolism → M/C & worst.
2) Acute Thrombotic (On top of As)
3) Arterial Injuries.
4) Dissecting aortic aneurysm.
5) Phlegmasia. (Massive DVT)
6) Spasm. (Ergot poisoning)
7) IA injections. (Addicts)



1) Pain: earliest & the main presenting
   - Sudden onset.
   - Site of obst. & shoots dx.
   - Bursting or stabbing dt VD + edema.
   - ↑ by mov. or warmth &
     ↓ later on dt ischemic sensory loss.
2) Pallor then Cyanosis.
3) Progressive coldness.
4) Parenthesia then sensory loss.
   (light touch is the 1st to be lost)
5) Paresis & ms weakness → Paralysis.
   (1st is intrinsic ms. of foot)
6) Pulselessness → loss of dx. pulsations

Signs of irreversible ischemia (Indications of Amputation?
- Ms. turgidity or fixed motling.
- Palpable popliteal pulse → BKA.
- Not palpable → AKA.



1) Ms necrosis → within 6-12 hrs.
2) Moist aseptic gangrene → within 24 hrs.
3) Extension of the thrombus.
4) Chronic ischemia if:
   a) Acute thrombotic.
   b) Acute embolic at low level occl.usion only (Infra-popliteal)
5) After TTT → Reperfusion injury
   If Embolectomy after 6hrs.. = 3C

	Compartmental $	Cardiac Arrhythmia	Crush $
Path.	**↑ Pr. in a closed fascial compartment dt** Release of inflam. mediators → VD + damage of endoth. → edema → ↑ pr. in the closed compart.!	• An. metabolism → L. Acidosis. • K+ from the damaged cells.	Release of Mb from ischemic ms →ATN
TTT.	**Fasciotomy**	**$NaHCO_3$ & Glu-Isulin inf.**	**Mannitol & Dialysis**

	Acute Embolic	Acute Thrombotic	Acute Arterial Injury
Etio.	**Source of embolus:** 1. Heart: • AF (M/C) – MI. • Prosthetic valves. • SBE → valve vegetation. 2. Aortic Aneurysm.	**Disturbance in Virchow's triad** 1) Atherosclerosis. (M/C) 2) Polycythemia. 3) Dehydration. 4) Prolonged immobilization. 5) Typhoid fever.	a) **Open:** • Penetrating traumas. • Following arterial cannulation. b) **Closed:** • Plaster or tourniquet compression. • Fracture or dislocation. • Blunt injuries
Path.	**Site of impaction = Bifurcation of vs (Common femoral (M/C) , Aorta, Popliteal)** • Small diameter. • Slow circulation. • Turbulence.	**Site: Lower down (On top of Chr. Ischemia)**	1) Complete injury → Ischemia. 2) Partial → bleeding. **Types of arterial injuries:** 1) **Compression** → Reversible ischemia. 2) **Contusion** → VC & spasm or thrombosis. 3) **Clean cut:** partial = Hge / Complete= ischemia. 4) **Lacerated** (in crushed injuries → ischemia. 5) **A-V fistula** → disturbed hemodynamics & HF. 6) **False aneurysm** → pulsatile swelling.
Cl./P	Young age + 6 Ps	Age: Old less sever dt already ischemic LL	
Hx.	AF or recent MI + No hx. of claudication.	Trophic changes, claudication.	
Assoc.	Sudden painless loss of vision!	Atherosclerosis. (of Chronic ischemia)	
Onset	Dramatic. (within seconds)	Sudden or acute (within hours)	
Exam	• **No trophic changes.** • **Pulse** → AF or normal on the other side.	• **Trophic changes.** • **Pulse** → Regular or weak on other side	

Fixed (sure signs)	Soft signs
1) Ext. arterial bleeding 2) Persistent ischemia & loss of pulse after resuscit. 3) Expanding hematoma • Pulsatile swelling. • Palpable thrill. • Machinery murmur.	1) Hematoma: small or mod., not pulsating nor expanding 2) Wound px. to a known vs. 3) Injury of a nearby n. 4) Unilat. limb ischemia with absent pulse.

	Acute Embolic	Acute Thrombotic	Acute Arterial Injury
Invest.	1) **Arterial duplex** → No flow. 2) **No time for pre-op. Angio except if** we can't diff. bet. embolic (sharp cut off or cresenteric sign) or thrombotic clinically! **& only done intra-op.** for adequate Embolectomy. 3) **ECG & ECHO.**	1) **Arterial duplex** → No flow. 2) **Angiography is a must** → +ve run off or not? (Same value) 3) **ECG & ECHO**	**Hard signs** → NO NEED → ER exploration. **Soft signs:** 1) Arteriography → most accurate & diag. 2) Arterial Duplex / PXR.
TTT. (General)	**(1) Immediate Heparin → ↓Propagation of Thrombus:** • Analgesics. • Assoc. condition → TTT. of AF. • ↑Perfusion by → foot dependence, Never apply external heat, O_2 inhalation.	✓ **(1 – 5 as Acute thrombotic except (2) is Angiography)**	1) **Resuscitation.** 2) **Heparin** → # in multiple injuries. 3) **Prophylactic ABS.** 4) **Orthopedic** repair should be done 1st

Specific

Acute Embolic

(2) Immediate Embolectomy

- Fogarty catheter under LA.
- Followed by long term Anti-coag.

Signs of perfusion

- Back bleeding.
- Pulsations can be felt.
- Intra-op. angiography.

Complications

- Rupture of artery.
- Dissection & Dx. embolization.
- Re-perfusion if > 6hrs..

Value?

- *Exact site + Collaterals & run-off.*
- *Condition of vs → healthy (regular)*
- *Embolus → sharp cut-off, reversed meniscus sign, clot silhouette!*

(3) Prev. of Reperfusion Injury If > 6hrs.. (see B4)

(4) TTT. of Complications & PDF. (see B4)

(5) Gangrene → Amputation.

Acute Thrombotic

(2) Angiography

- +ve Run off & Good collat. → Bypass
- No run-off + Bad GC or HR → Intra-arterial thrombolysis
  - ↓ Only in 1st 72 hrs. in absence of any # (see DVT)
  - Streptokinase.
  - Urokinase.
  - TPA. (Pulse spray)
  - ↓ Then bypass later on

Acute Arterial Injury

- **Venous Repair** should be delayed till the pt. is hemo-dynamically stable.
- **Dx. Fasciotomy** if > 6hrs. or ms. edema.

1) **Complete:**
- End to End anastomosis + suturing if there's no gap (Not preferred dt Hge & n. injury)
- Graft (REVERSED SV GRAFT → 1st CHOICE)

2) **Partial** → direct suturing or vein patch graft.

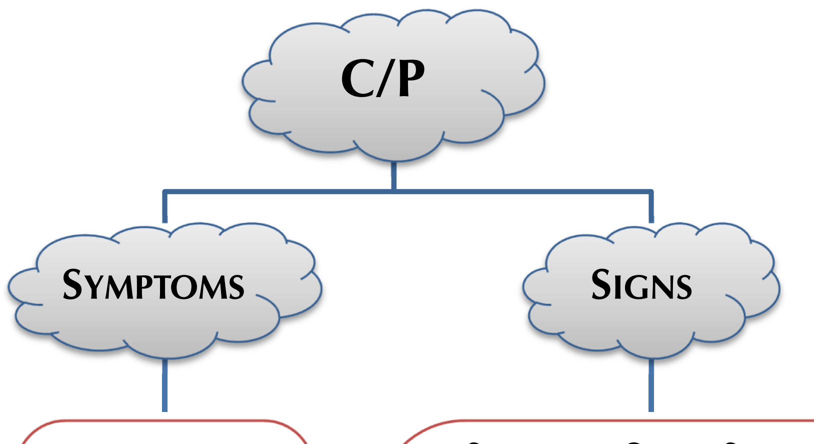
3) **Contusion** → Segmental Excision + Graft.

4) **Spasm:**
- Local papaverine or novocaine.
- IA injection of heparinized isotonic saline.
- If persistent → Segmental excision + SV graft!

ANEURYSM

"SAC CONTAINING BLOOD, COMMUNICATING WITH LUMEN OF AN ARTERY!"

CLASSIFICATION		
ETIOLOGICAL	**PATHOLOGY**	• Atherosclerosis. • Collagen ds. (Behcet, Marfan, Ehler-Danlos) • $ - HTN (Dissecting AA) • Infections: SBE → Mycotic aneurysm.
	TRAUMA	1) Blunt → weakens part of the wall. 2) Penetrating → false aneurysm.
	CONGENITAL	1) Circle of Willis → SA Hge!! 2) Splenic, renal, celiac vss!!
STRUCTURE	→ True (3 layers) or False. (fibrous wall of hematoma dt partial injury of an artery no endoth.)	
SHAPE	→ fusiform, saccular, dissecting.	



SYMPTOMS

<u>SILENT & ACC. DISCOVERED ON U/S</u>

- Pulsatile swelling
- Complications. (see AAA).

SIGNS

<u>SWELLING = CYSTIC, SMOOTH, ROUNDED, COMPRESSIBLE</u> → except if full of mural thrombus

- **<u>SITE</u>**: along the line of an artery.
- **<u>MOBILITY:</u>** across & not along.
- **<u>SPECIAL CHARACTER:</u>**
  - a) Expansile pulsations (most imp. sign)
  - b) Systolic thrill ± bruit
  - c) px. pressure → disapp. of pulsations!
  - d) Dx. pressure → ↑in size & tense!

INVEST. (see AAA)
TREATMENT

<u>EXCISION & GRAFT</u>

- **<u>AORTIC & POPLITEAL</u>** → Exclusion Graft (Graft insertion inside the sac without removal)
- **<u>RADIAL & ULNAR</u>** → Excision + Arterial ligation. (to avoid injury of the nearby vein)

DD: Pulsating swellings



<u>1) Swelling over an artery</u> → <u>Transmitted pulsations</u>

- Doesn't change in size.
- If moved away from artery, pulsations disapp.

2) V. vascular tumors → Osteosarcoma or metastasis

3) AV fistula (Varicose aneurysm)

4) Any abscess.

- **M/C CENTRAL ANEURYSM → AAA**
- **M/C PERIPH. ANEURYSM → POPLITEAL ANEURYSM. (SEE MISC.)**

Abd. Aortic Aneurysm

M/C type of Aneurysms (True – Fusiform)

Site	Infra-renal in 95 % - At the iliac bifurcation.
Etiology	Atherosclerosis. (M/C cause in 95 %)

C/P

1) **Asymptomatic.** (M/C discovered acc. during routine U/S!)
2) **Pain: M/C symptom → Swelling enlarges → compression:**
   - a) Stomach → vague abd. Pain & dyspepsia.
   - b) Lumbar Vertebra → back & flank pain.
3) **Swelling** → as scheme but not common → Abd. pulsating mass.

Complications of Aneurysm

1) **Rupture: M/D** → Triad of: Sudden Sever pain + Shock + pulsatile abd.
   - Retro-peritoneal (M/C)→ narrow space → hematoma → compresses the artery & stop the bleeding
   - Intra-peritoneal → Rare & fatal. (pt. dies on the spot)
2) **Acute Ischemia dt Dx. embolization:**
   - Acute embolic (mural thrombus → M/C site of impaction: bifurcation of the femoral artery
   - Blue toe $ = Iatrogenic trash foot → small embolus lodged in 1 of the digital arteries of the toes → cold & ischemic with intact pedal pulse
3) **Chronic ischemia.**
4) **Infection** → rupture & 2^{ry} Hge!
5) **Compression on:** • Vein → DVT • **Nerve** → motor or sensory • **Bone** (eg: sternum) → erosion.



1) **Abd. U/S** → screening.
2) **Abd. CT scan → best:** (size -leaking or ruptured AAA -compression)
3) **Angiography:**
   - Can't detect the mural thrombus → false d.
   - Extension to iliac, renal & mesenteric arteries?!

CT Scan

Surgery

1) Ruptured.
2) Impending rupture.
3) >5 cm or Symptoms.
4) If < 5 cm but rate of gr. > 0.5 cm in 6 ms

Open Exclusion graft

Synthetic graft separated from the bowel by closing the ant. Wall of the aneurysm.

Complications of repair:

1) Declamping hypotension.
2) Trash foot dt µ-embolization.
3) Lt colon ischemia.
4) Paraplegia dt clamping of spinal a.

Endovascular repair (most recent)

via Angiography under LA for HR pts. where GA is #

Endoluminal stented graft via bilat. femoral arteriotomies!!

- Very expensive.
- high recurrence rate.

No Surgery

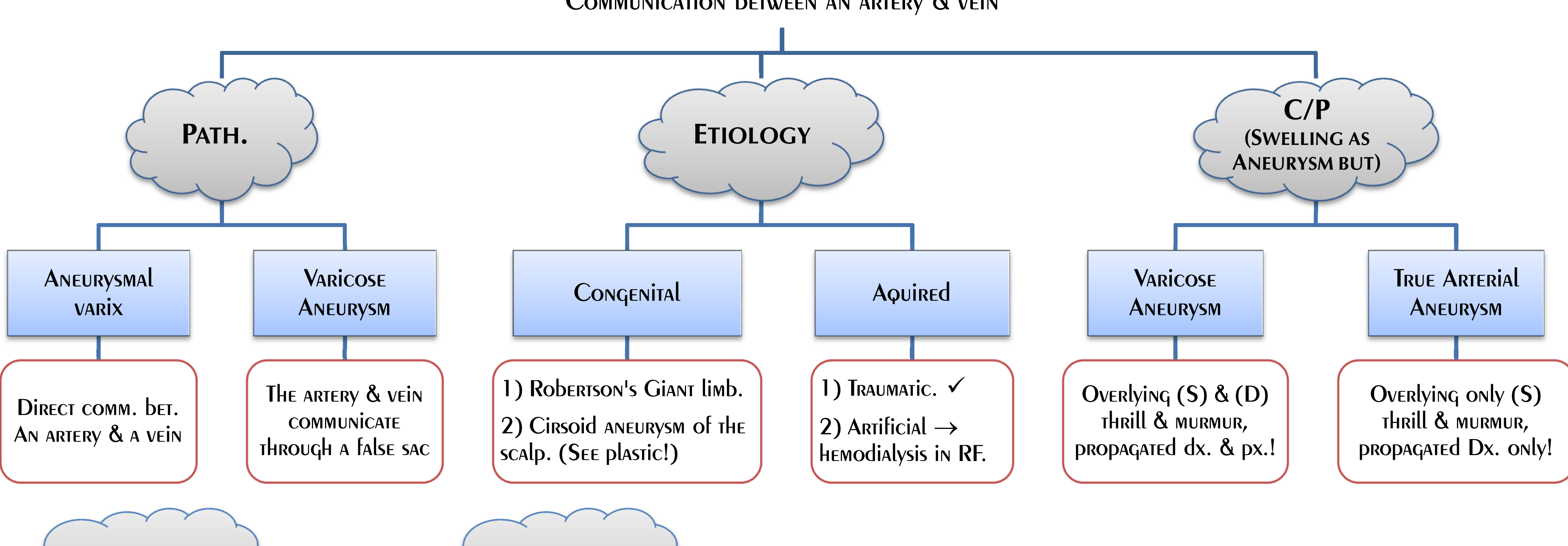
Regular follow up (U/S every 6 ms)

Asymptomatic AND < 5cm

AAA repair by "Dacron or Gortex"

SV graft in popliteal AA

A-V Fistula



Invest.

1) **Arterigraphy.**

2) **Doppler or Duplex.**

3) **Cirsoid aneurysm of the scalp**

A) ECA angio for any IC connections.

b) PXR → Rarified bone.

Treatment

1) **Robertson's Giant limb** → (stationary & needs no interference)

2) **Cirsoid aneurysm** → Excision under GA hypotensive + Pre-op. embolization by gel-foam of ! feeding vs!

3) **Acquired:**

a) Excision of fistula & Repair!

b) Quadriple lig. of both A & V above & below the fistula.

Effect on Limb

1) **Robertson's Giant limb** → Local Gigantism.

2) **Chronic Ischemia.**

3) **Pulsatile VV** dt ↑ venous flow!

Effects on Circ.

1) **Hyper-dynamic circ. dt** ↑VR, ↑COP, ↑HR & pulse pr.

2) **Branham's bradycardic reaction** compress the artery px. to fistula → bradycardia.

3) **LV ++** → high COP failure.

Chronic Ischemia

"Slowly prog. Gradual ↓ in the arterial limb perfusion affecting it's function & Vitality"

(Giving enough time for the collaterals to develop → so gangrene occurs late)

Etiology

> 45 yrs.

Atherosclerosis (M/C cause)

Major RFs:

- HTN, hyperlipidemia, smoking.
- DM, Obesity.
- +ve FH - Stress.

< 45 yrs.

- DM. (pre-senile As)
- Buerger's. (males)
- Raynaud's. (females)
- After TTT of A. ischemia.
- Aortic aneurysm.
- Thoracic Outlet $.

Cl./P

Symptoms

1) **Pain. (Main symptom)**
2) Trophic changes & gangrene.
3) **Leriche $.** (see misc.)
4) **Ch. ischemia else where:**
   - Angina pectoris.
   - TIA -hx. of stoke.
   - Post-cibal angina.

Grading "Fontain's Staging"

- **Grade I** → Asymptomatic.
- **Grade IIa** → mild claudications
  IIb → crippled claudications interfering with his activities
- **Grade III** → Rest pain.
- **Grade IV** → ulcers or gangrene

CLI = GRADE III & IV

Intermittent Claudications (Grade II)

- Cramp like – Induced by exercise – relieved by rest.
- **Site:** eg. Aorto-iliac obstn → Gluteal pain.
- **Claudication distance** = after which the pt. starts to feel pain. (<150 m=CLI)
- **Claudication time**= the time the pt. can walk on a treadmill till he feels pain

Both are 1/α prop. to the severity of ischemia!!!

Rest pain (Grade III = CLI)

- Burning pain & numbness in the toes & dorsum of foot
- Due to cutaneous nerve ischemia.
- More sever at Night?
- Relieved by putting the leg below the level of the heart & rubbing the dorsum of the foot.

LOCAL EXAM.

2 INSPECTION

1) TROPHIC CHANGES:

- **SKIN** → cold, thin, atrophic, dry, loss of hair, brittle nails, ulcers (GRADE IV = CLI), fungal inf. bet toes.
- **SC TISSUE & MS** → wasting.
- **NERVES** → numbness (sensory) /weakness. (motor)
- **BONE** → Osteoporosis.

2) COLOR CHANGES:

a) PALLOR → in comparison to hand (not the other LL)

b) DEPENDENCE TEST (RUBOR & CYANOSIS)

- Accum. metabolites → marked VD of cap. → Stagnation.
- 1st red then blue dt extraction of O_2 by ts.
- **RUBOR** = reversible, ↑ with dependency & ↓ with leg elev.
- **FIXED BLACK COLOR** → dry gangrene.

2 PALPATION

1) PULSE:

Absent or weak! (Normally Dorsalis pedis pulse is absent in 10 %)

Differentiate A. ischemia by hx.

2) TEMP: COLD BUT FALSELY WARM IF?

- Kept under clothes.
- Infection.
- Previous Sympathectomy.

DD OF CHRONIC ISCHEMIA

1) **VENOUS:** *pain ↓ by rest & limb elev.*
2) **DISC PROLAPSE:** *pain starts by walking.*
3) **OSTEO-ARTHR.** *Joint pain + intact pulses.*

3 – 4 SPECIAL TESTS

1) BURGER'S ANGLE: (N = 90)

- Angle at which blanching of the toes occurs on gradual limb elevation.
- 1/α prop. To the severity of ischemia
- If < 20 → advanced ischemia

2) CAPILLARY CIRCULATION: (N = < 2 SEC)

if > 30 sec → advanced ischemia

3) HARVEY'S VENOUS RE-FILLING: (N = 10-15 SEC)

- limb is elevated till veins disappear → Guttering at 10 -15 limb elevation.
- Then bring it down to a hz. position.
- If > 2 min → advanced ischemia

4) DISAPPEARING PULSE TEST:

on exercise dt pooling of bl. (early sign of ischemia)

INVESTIGATIONS:

a) **LAB** → CBC, blood sugar, Lipid profile – ECG & Echo.

b) **RADIOLOGY:**

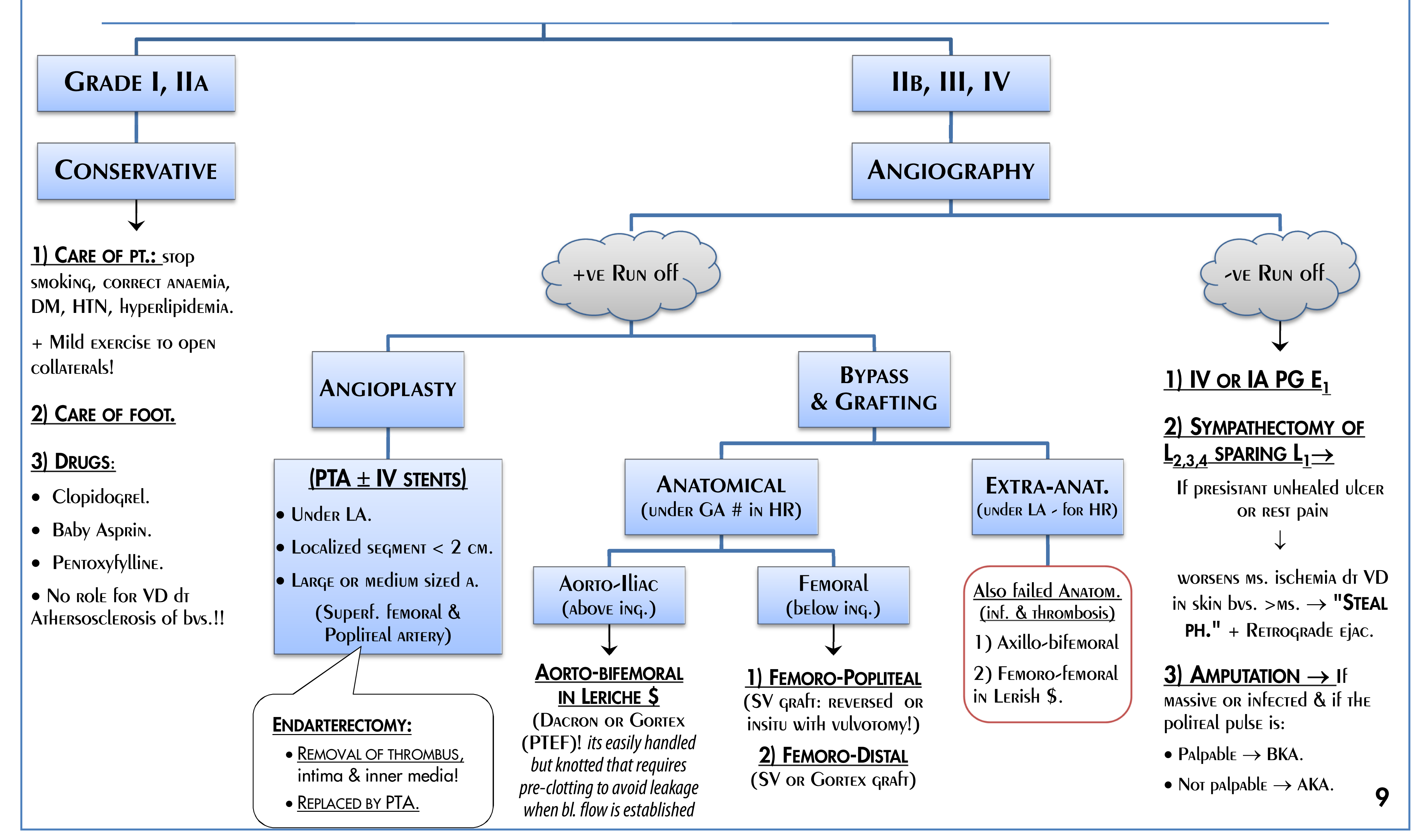
1) **DOPPLER** → **MONOPHASIC - A/B INDEX:** If < 0.5 → CLI. (Grade III – IV)
2) **ARTERIAL DUPLEX** → **non-invasive. "best"**
3) **ANGIO**
   - a) **CONVENTIONAL** → Invasive! (using Seldinger's needle) only pre-op.
   - b) **MRA** → non-invasive, no dye → used in pts with RF, less accurate, diagnostic only, expensive!
   - c) **DSA** → hides the bone!!

VALUE OF ARTERIOGRAPHY?

1) Exact site & length of arterial block.

2) Run off – Collaterals – Vs. wall.

Treatment of Chronic Ischemia



BURGER'S DISEASE
(THROMBANGITIS - OBLITERANS)

ETIOLOGY: May be due to allergic response to nicotine. "Vasculitis" (Write Chronic Ischemia)

• **B**	• **Boys only.** (Young age 20-40) • **Bilateral.** (1 limb precedes the other) • **Bundle.** (Neuro-vascular are also affected)
• **U**	**U**lcer (v. early & common = Grade IV) → TTT: lumbar sympathectomy
• **E**	**E**nd arteries are affected → so bypass & angioplasty are useless.
• **R**	**R**est pain is early & common. (Grade III)
• **G**	**G**ender: males only
• **E**	**E**migrant → Thrombo-phelibitis migrans in LL & VV!
• **R**	**R**aynaud's ph. = **PCR (Pallor – Cyanosis – Redness)**
• **'S** (TTT)	(1) **S**top smoking → the only TTT. (2) **S**ympathectomy (lumbar) only if persistent unhealed ulcer or rest pain!

- **INVEST = ANGIOGRAPHY → CORK-SCREW APP. OF VS!**
- Read "Vasospastic disorders = Raynaud's disease & ph."!

RAYNAUD'S DISEASE = PCR:

"Young females on exposure to Coldness or Emotional stress"

- **PALLOR:** dt sapsm of digital arterioles.
- **CYANOSIS:** VD of cap. Filled with slowly flowing deoxyg. Blood.
- **REDNESS:** as the attack passes of, VD of arterioles → passage of Oxyg. blood.
- **TTT.** = **AVOID COLD WEATHER + VD DRAGS + CCB + CERVICO-DORSAL SYMPATHECTOMY.**

Diabetic Foot

"Complex pathology in the foot of a diabetic patient that's related to duration & control!"

	Diabetic Ischemic Foot	Diabetic Neuropathic Foot	Diabetic Infective Foot
• **PDF:** *M/C TYPE is MIXED!*	• Micro-angiopathy → Vasculitis. • Macro-angiopathy → pre-senile As. • Same Cl./P of Chronic ischemia.	• Periph. neuropathy → more susceptible to trauma • Intrinsic foot myopathy: → Joint subluxation → abnormal mov. → Continue on walking dt p. neuropathy → foot deformities → localized areas of ↑pr. → bursae, callus → ruptures → ulcers!!	• Immune-comp. → infection. • Polymicrobial. • Formation of pus, necrosis, grey & black sloughs.
• **Site**	Big toe or foot margins & dorsum	Pressure areas → heel or plantar surface.	Anywhere
• **Size**	small	Large	Large
• **Depth**	Superficial	Deep	Superf. but extends deep into the tissues
• **Pain**	Painful (as chronic ischemia grade IV)	Painless	Painful
• **Temp**	Cold	Warm	Warm
• **Pedal pulse**	Absent	Felt	Felt
• **Complications**	Dry ischemic gangrene	Deformities	• Septic shock & septicemia. • Osteomyelitis & DKA. • Necrotizing fasciitis → Gangrene.

Invest.

- **LAB** → Blood chemistry, blood sugar, CBC, C&S
- **X-RAY FOOT** → OM + gases. (anaerobic)
- **ANGIO & DUPLEX** → ischemia

TTT

Prevention

1) Control of DM.

2) Care of foot → careful trimming, regular exam, avoid tight foot wear & walking bare foot, good washing & proper drying.

1) hospit., rest, foot elev.
2) Shift to Crystaline insulin.
3) Gangrene → Amputation.

3rd Gen. Quinolones + Clindamycin + Imipenam then acc. to C&S

Feel the Pedal pulse

Palpable ↓ Debridement* + Repeated dressing + **ABS** + Repeated*+ Graft

Not Palpable ↓ Correct 1st Ischemia by Angio then Bypass (femro-dx.)

Thoracic Outlet $

"Neuro-vascular $ due to compression of roots of the brachial plexus & Subclavian artery as they pass from neck to the axilla through the thoracic outlet!"

Invest:

1) **PXR** neck & chest for etiology.
2) **Arteriography.**
3) **EMG & NCV.**
4) **MRI** for scalene ms. abnormality.

Symptoms

Arterial (Subclavian artery)

1) Ch. UL ischemia.

- Claudication
- Raynaud's ph.

3) Complicated cases:

- Atherom. changes.
- Aneurysmal dilatation.
- Showers of emboli dt detachemnt of thrombus at the post-stenotic dilat.

Nervous (Lower trunk of br. plexus)

M/C Presentation

1) Shooting Pain + Tingling & numbness over the ulnar side of the hand & forearm.

2) Weakness & atrophy in thenar & hypoth.+ Complete claw hand!

Venous (Subclavian vein)

Passes ant. to scalenus ant. → rarely affected!

- Edema & VV.
- DVT.

Signs

General

- **Unequal pulse** on both sides.
- **Hypothesia** on the ulnar surface of forarm & hand.
- **Wasting** of thenar & hypoth. ms.
- ± **Palpable Cx. rib.**
- ± **(S) bruit** over the dx. part of the subclavian artery.

Adson's deep breathing test

- Pull arm downwards.
- Turn his head towards the side of the symptoms
- Elevate the chin & take a deep breath, then hold → loss of radial pulse!!

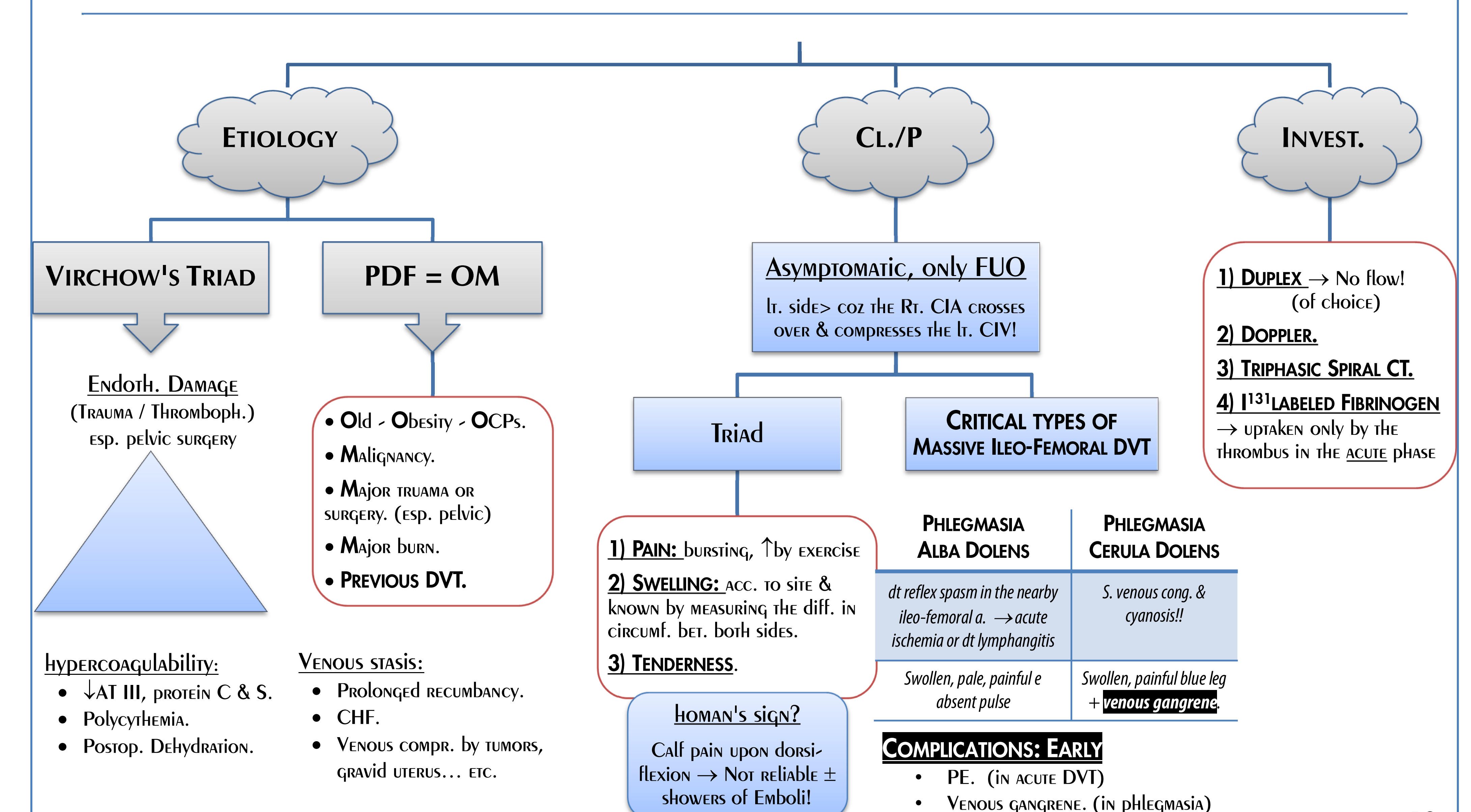
TTT. of the Cause

- **Cervical rib or scalene $**
  - **Mild + Neuro S/S** → **Conservative**
    - Medical + physiotherapy.
    - 1st line & more preferable.
  - **Sever + Vs. S/S** → **Surgical**
    1) Scelenotomy → division of the scalenus ant. at it's insertion.
    2) Excision of Cx. rib.
    3) Cx.-dorsal sympathectomy.
- **Malunion fr. clavicle** → Osteotomy + IF
- **Pancost tumor** → Radiotherapy

Anatomy & Etiology of the Thoracic outlet $

Ant.	Scalenus Ant.
Post.	Scalenus Medius → hypertrophy, abnormal insertion, rudimentary arising from C_7 to 1st rib (Scelene $)
Inf.	• **Clavicle** → Malunion of fractured clavicle, • **Cx. Rib** → more on the Rt side. • **1st Rib** → Tumor, infection. • **Other causes** 1) Pancost tumor. 2) Post. Insertion of the brachial plexux (C6 -T2)

DVT



Etiology
Cl./P
Invest.
Virchow's Triad
PDF = OM
Endoth. Damage
(Trauma / Thromboph.)
esp. pelvic surgery
hypercoagulability:
• ↓AT III, protein C & S.
• Polycythemia.
• Postop. Dehydration.
Venous stasis:
• Prolonged recumbancy.
• CHF.
• Venous compr. by tumors, gravid uterus… etc.
• Old - Obesity - OCPs.
• Malignancy.
• Major truama or surgery. (esp. pelvic)
• Major burn.
• Previous DVT.
Asymptomatic, only FUO
lt. side> coz the Rt. CIA crosses over & compresses the lt. CIV!
Triad
Critical types of Massive Ileo-Femoral DVT
1) Pain: bursting, ↑by exercise
2) Swelling: acc. to site & known by measuring the diff. in circumf. bet. both sides.
3) Tenderness.
homan's sign?
Calf pain upon dorsi-flexion → Not reliable ± showers of Emboli!
Phlegmasia Alba Dolens
Phlegmasia Cerula Dolens
dt reflex spasm in the nearby ileo-femoral a. → acute ischemia or dt lymphangitis
S. venous cong. & cyanosis!!
Swollen, pale, painful e absent pulse
Swollen, painful blue leg + venous gangrene.
Complications: Early
• PE. (in acute DVT)
• Venous gangrene. (in phlegmasia)
Late: CVI & post phlebitic $ (c later)
1) Duplex → No flow! (of choice)
2) Doppler.
3) Triphasic Spiral CT.
4) I131 labeled Fibrinogen → uptaken only by the thrombus in the acute phase

Treatement of DVT

Prophylaxis

LMWH peri-op for HR

Pre-op. → elastic stocking & LMWH for HR

Intra-op. → Intermit. pneumatic ext. calf compr.

Post-op → early ambulation, leg exercise, good hydration.

In case of Acute DVT → Bed rest for 10 days till it becomes adherent to wall to avoid PE → also same time of stopping heparin & anti-coag.

Drugs

Anti-Coagulants
to preventprog. of thrimbus

	Heparin		Oral Anti-coag. (Warfarin)
	Unfrac. Heparin	LMWH (Clexan)	
Mech. of action	*forms an active complex with AT III → (-) factors 9,10,11*	*Anti-factor 10 only*	*Vit. K dependent factors → 1972*
Onset:	*Immediately*	*after 1 hr*	*stop Heparin 3 days from starting Warfarin*
½ life	*1.5 – 3 hrs.*	*12 hrs.*	*36 hrs. (1.5 day)*
Dose	*5000 IU/ 4 hrs.*	*1mg/ Kg/ 12 hrs.*	*5 mg daily dose*
Route	*IV drip, better bolus*	*SC*	*Orally*
Given for	*7-10 days*	*7-10 days*	*6 ms or life long if DVT.*
Follow up	***PTT (N =30-40 sec) kept twice the normal***	*Active factor 10*	***PT = kept 2X the normal. INR = 2-3.***
Compl.	• *Bleeding tendency.* • *HIT. (idiosyncrasy)*	***No risk of HIT nor bleeding*** *"as its easier to adjust the dose"*	• ***Bleeding.*** • ***Drug interaction:*** *NSAIDs – ABS – h_2 Blockers. (⊕ Warfarin without ↑ the dose)* • ***Teratogenic*** *so # in preg!*
Anti-dote	Protamine sulphate (1 mg neutralizes 100 IU)		IV vit. K injection. (10-20 mg)

Thrombo-lytics

Only in Massive DVT in the 1st 24 hrs.

But Contraindicated in:

- Neurosurgery → 3 ms
- post-op after → 10 ds.
- Active or recent bl. in the previous 10 days.
- Uncontrolled HTN.
- Allergy.

Surgery

1) Venous Thrombectomy

Only in Massive DVT by Fogart catheter if Thrombolytics are #.

2) IVC filter

1) Recurrent Showers of emboli.

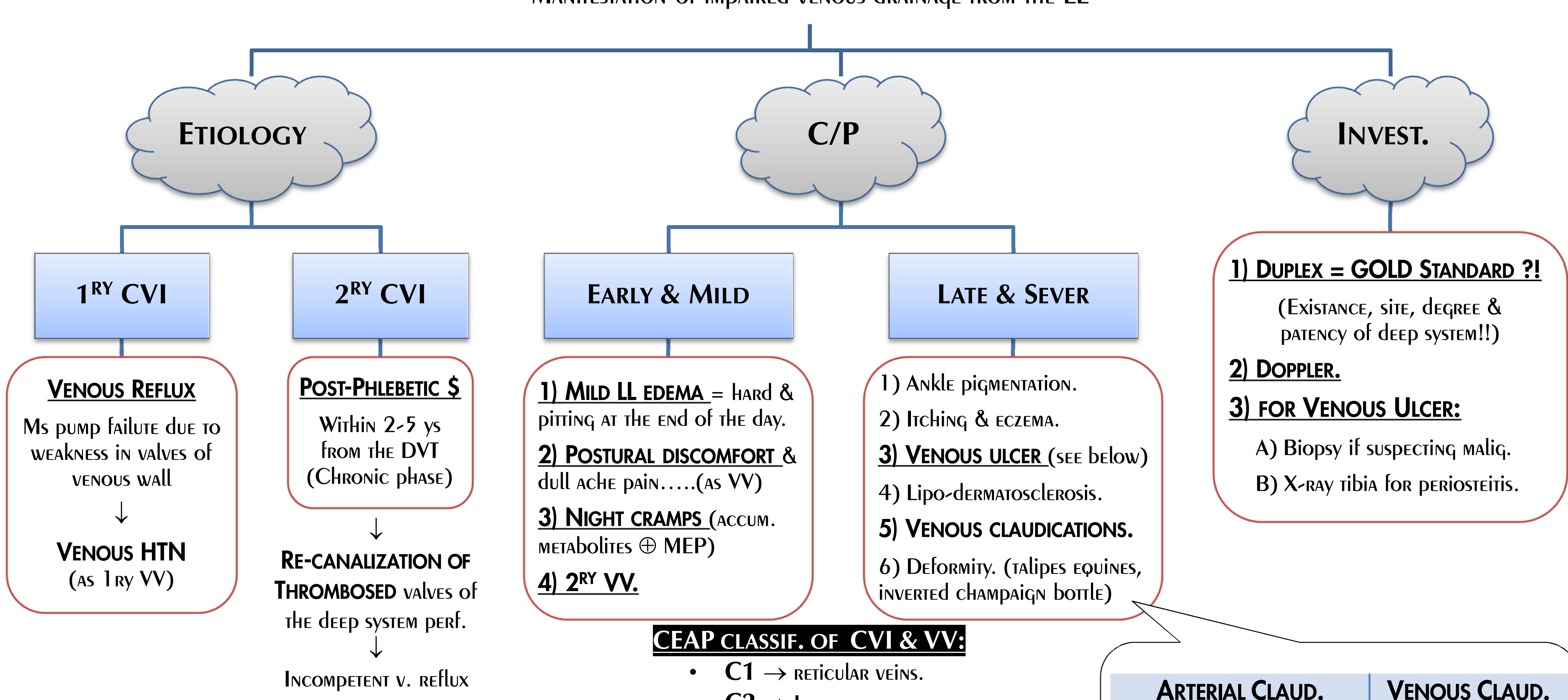
2) # to heparin.

3) DVT b4 major surgery.

4) HR patients.

Chronic Venous Insuf.

"Manifestation of impaired venous drainage from the LL"

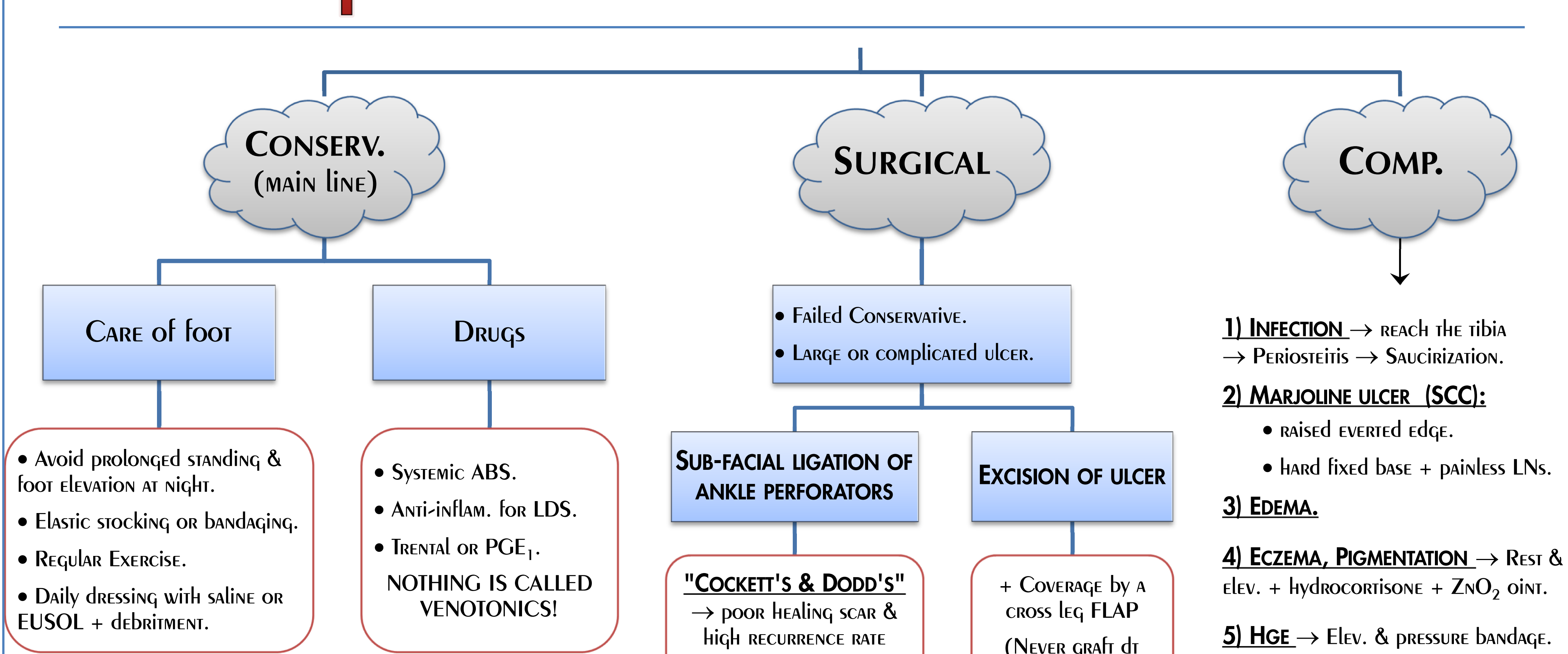


CEAP classif. of CVI & VV:

- C1 → reticular veins.
- C2 → Large.
- C3 → Edema.
- C4 → Eczema, pigmentation, dermatitis.
- C5 → ulcer.
- C6 → unhealed ulcer.

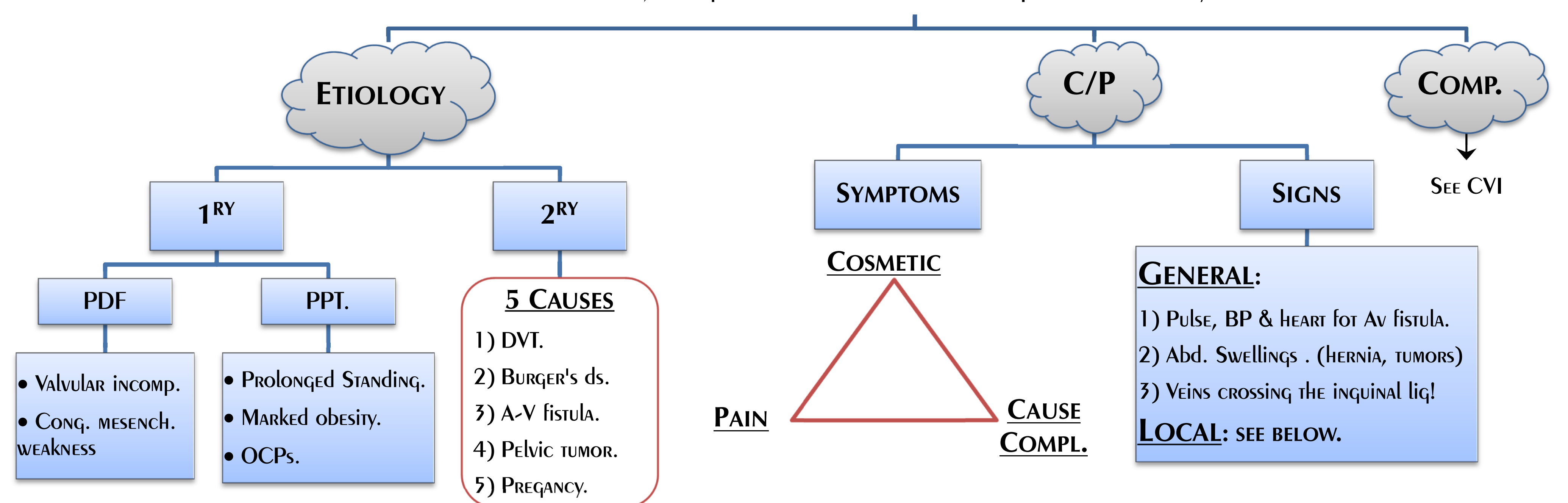
Arterial Claud.	Venous Claud.
• ↑by walking & ↓by rest. • ↑ at night if rest pain. • ↑ ↓by dependence (↑bl. supply)	• The same. • Night cramps. • ↓by leg elevation.

Comp. & Treatement of CVI



Varicose Veins

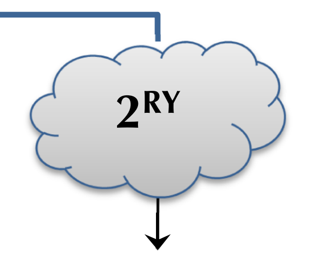
"Dilated, elongated & tortous veins of the superficial venous system!"



Inspection	Palpation	Percussion	Special tests
1) Both LL: symmetrical or not. **2) Dilated veins & distribution.** • ↑ or ↓ by leg elevation. **3) Swellings:** • SV = Saphina Varix (dilated px. part of LSV dt reversed flow) • BO = Blowout → confirm by palpation. (Fegan's test) **4) Complications.**	**1) Dilated veins:** a) Milking test → for dilated tortous v. crossing the ing. Lig → Reversed flow → Sure sign of 2^{ry} VV. b) Thrombophlebitis → RHT, cord like. **2) Swellings:** a) Saphina varix: • Thrill on cough. • Bluish - Cystic.- Compressible. • DD = Swellings in femoral triangle b) Blow out: Fegan's test. (see clinical)	(Tap test) 1) Schwartz. 2) Chervier. (See the clinical part for details)	**1) Trendlenberg Test (TT)** • detects incompetence of SFV • incompetence of communicating veins. **2) MT = Mourrissey's Test** for SFV → retrograde venous wave on cough → seen & palpable **3) MTT = Multiple Tourniq. Test** for perforators. **5) MPT = Modified Perth's Test** for patency of deep system. **6) Hoffman's**

TTT. of Varicose Veins





1RY

Conserv.

- minor varicosities
- HR patients.

- Reassure & avoid prolonged standing.
- Regular Exercise.
- Elastic stocking & limb elevation.

"Nothing called Venotonics!"

Injection Sclerotherapy

Indications:

- Cosmetic disfiguiremnt.
- Residual VV after surgery.
- Bunch of VV around single perf.

Contra-indications

- Septic thrombophl.
- Secondary VV.
- SFJ is incompetent.

Material used: Conc. Glucose - histrocryl or 5 % Ethanolamine oleate

Complications

- Extravasation→ sloughing & skin necrosis.
- DVT. (if large amount)
- Snstivity → Shock.

Surgical

A) Trendlenberg's Operation:

- SFV incompitent.
- Stripping of the LSV → flush with femoral vein to avoid stasis → DVT.
- ligate all it's tributaries to avoid it's major complication → Recurrence!

B) Stripping of LSV: with compit SFJ.

- Disadv. → Saphenous n. injury.
- If recurrence → Hook / Ambulatory phlebectomy with 2 mm incision.

C) Tripple Ligation of incompetent perforators if 2 or 3 in no.

2RY

(A) Of the cause

1) Post phlebitic:

- Elastic stocking.
- Duplex for patency deep system.
- Surgery is # if deep system is occluded.

2) A-V fistula:

A) Acquired: surgery & residual veins are TTT as 1ry VVs.

B) Cong.: Conserve & is the deep system is aplastic or hypoplastic?!

3) Pregrancy: Elastic stocking & residual veins are TTT as 1ry.

(B) of Complications. (c B4)

Recent lines:

A) EVLA. (EndoVenous LASER Ablation)

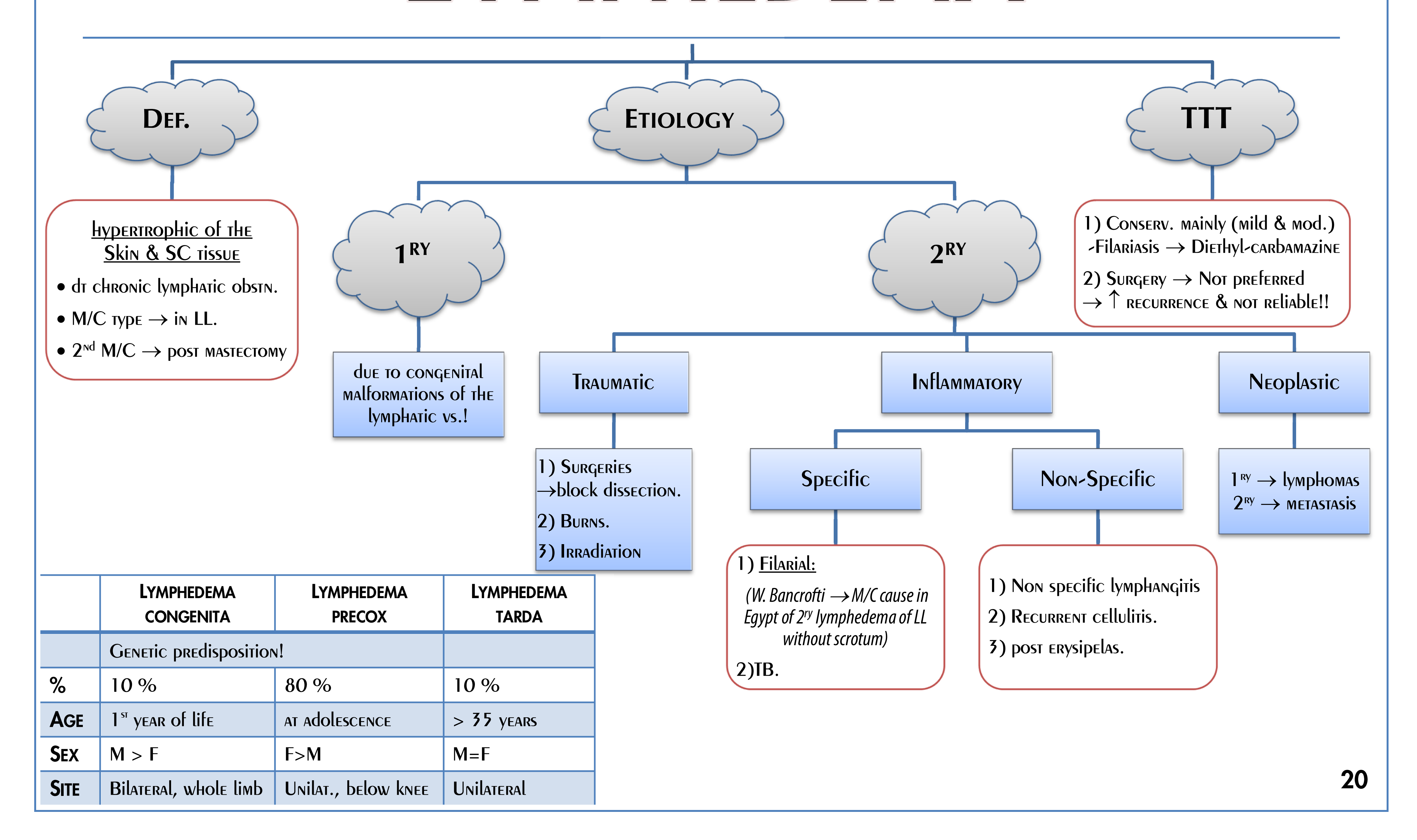
B) RFA. (Radio-Frequency ablation)

C) Valvoplasty.

Chronic Leg Ulcers

	Traumatic	TB	Syphilis	Neuropathic	Ischemic	Venous
• Site	Over bony prominence	Related TB lesion (Joint – Bone – LN)	Upper 1/3 of outer aspect of leg	Pressure sites	Toes or dorsum of foot.	Gaiter area. (medial malleolus)
• No	Single	Multiple	Multiple & coalesce (large serpingeous)	Deep penet. to bone	Single or multiple (Superficial)	Usually multiple. (at site of incompetent valves)
• Edge	Punched out or sloping	Undermined	Punched out	Undermined	Punched out	Sloping – punched out. (healing)
• Margin	Pigmented	Cyanotic	Cyanotic		Pale	Red hyperemic.
• Floor	Granulation t.	Caseous material	Wash leather slough		Granulation t.	Granulation t. (infected?)
• Painful	Painless unless infected	Painful	Highly painful	Painless	Painful relived by limb dependency	Early painless late painful relieved by limb elevation.
• Base	Indurated	Soft	Indurated		Soft hen hard	Indurated & mobile.
• Ass.	LN ++ if infected: • Elastic. • Tender, mobile.	Inguinal LNs are matted		• Peripheral neuritis. • DM.	Ischemic changes	• of CVI. • LNs ++ if: 1) Turns malignant. (fixed) 2) Infected → Tender & mobile.
TTT.	1) Rest & elevation. 2) Dressing & pr. bandage + ABS. 3) If large → Excision & Cross leg flap.	1) Anti-TB drugs. 2) Curettage & Streptomycin dressing.	Penicillin & repeated dressing	Debridement upto Amputation if sever.	See TTT. of Chronic Ischemia	See CVI **Theories of Venous Ulcer:** 1) Fibrin Cuff theory (see misc) 2) WBC trapping theory.

LYMPHEDEMA



	Lymphedema congenita	Lymphedema precox	Lymphedema tarda
	Genetic predisposition!		
%	10 %	80 %	10 %
Age	1st year of life	at adolescence	> 35 years
Sex	M > F	F>M	M=F
Site	Bilateral, whole limb	Unilat., below knee	Unilateral

MISCELLANEOUS

POPLITEAL ANEURYSM:

M/C PERIPHERAL ANEURYSM

- Rupture is rare, ischemia is M/C. (as scheme)
- TTT → Exclusion & bypass.
- DD: other masses in popliteal fossa?
- **Pseudo-aneurysm → Evacuation (not excision) & arterial repair by suture or vein patch graft!!**

NB: 30 % of pts. with popliteal aneurysm have AAA.

- *10 % of pts. with AAA have popliteal aneurysm*
- *50 % bilateral.*

POST-CIDAL ANGINA:

INTESTINAL ISCHEMIA (DT CHRONIC MVO)

- Post-prandial pain.
- Wt. loss.
- Sitophobia ± Bl./Rectum. (due to mucosal sloughing)

LERICH'S $

ATHEROSCLEROSIS AT THE AORTO-BI-ILIAC JUNCTION = TRIAD OF

- Bilateral Absent femoral pulses.
- Bilateral LL claudication. (Gluteal)
- Impotence.

AMBULATORY VENOUS PR.?

during walking must be < 25 mmHg!

But the pr. in superf. Veins of legs during standing is approx: 80 mmHg!

SUPERFICIAL THROMBOPHLEBITIS:

- **TTT: ELASTIC STOCKING + ANTI-INFLAM. + AMBULATION.**

